MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

PEM0046 – INTRODUCTION TO PROBABILITY AND STATISTICS

(All Sections/Groups)

2 MARCH 2016
2:30 p.m. to 4:30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **4** pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary working steps **MUST** be shown.
4. Statistical table is provided.

Answer ALL questions (100 marks).

Question 1 (25 Marks)

(a) In a "3 Digits Challenge" game, there are 3 different machines, each with running numbers of 0 to 9. A participant needs to pay RM0.50 to participate in one game.

For each game, the participant needs to press the stop button of the 3 machines respectively to obtain the 3 digits combination. If the participant is able to get the string of digits 888, a reward of RM250 will be given.

(i) How many different combinations of 3 digits are possible? (2 marks)

(ii) What is the probability of getting the digits 888 in one game? (1 mark)

(iii) If the participant is able to get the digits 888 in his/her first game, what is the net gain/net loss? (1 mark)

(iv) Construct a probability distribution table for the possible gain in one game. (4 marks)

(v) Find the expected value of each game. (3 marks)

(b) Given that the expected value of a "4 Digits Challenge" game is RM2 and the expected value of a "5 Digits Challenge" game is also RM2.

You need to pay RM0.20 to participate in either one of the games. Which game will you choose to participate in order to have a better chance of winning? State your reason. (2 marks)

(c) Given the probability distribution function of a random variable X,

$$f(x) = \begin{cases} p\left(x^2 - 18\right), & 0 < x < 3 \\ 0, & \textit{otherwise} \end{cases}$$

(i) Find the value of p. (4 marks)

(ii) Find the cumulative distribution function of X. (6 marks)

(iii) Using the cumulative distribution function found in part (c)(ii), evaluate $P(X < 2.3)$. (2 marks)

Continued...

Question 2 (25 Marks)

(a) A random sample of 15 students from Foundation in Engineering is selected. 82% of these students mentioned that they managed to register their course online.

(i) Find the probability that 10 or more students managed to register their course online. (2 marks)

(ii) Find the probability that 5 to 7 students failed to register their course online. (3 marks)

(iii) Determine the standard deviation. (3 marks)

(b) On average, there is 1 error in every 3 pages of a book. Find the probability that in a particular book there are:

(i) exactly 2 errors in 12 pages. (3 marks)

(ii) at least 3 errors in 6 pages. (3 marks)

(iii) fewer than 5 errors in 21 pages. (3 marks)

(c) The lengths of carrot are normally distributed with mean μ cm and standard deviation σ cm. It is known that:

9 % of these carrots are longer than 18cm
32 % of these carrots are longer than 10cm

Determine the value of μ and σ. (8 marks)

Continued...

Question 3 (25 Marks)

(a) The number of pens sold by Melinda Bookstore in 6 hours is recorded hourly and tabulated as below:

Hour	1	2	3	4	5	6
Number of pens	3	5	2	5	7	8

(i) Determine the population mean. (2 marks)

(ii) Given that the sample size is **five**.
Construct a table for sampling distribution of the sample mean. (7 marks)

(iii) Determine the population standard deviation. (3 marks)

(b) The height of all basketball players in Team Bull is normally distributed with mean 178.1 cm and standard deviation 10.2 cm.

(i) A random sample of **4** players is selected. Find the minimum height of a basketball player if he is **taller than 86% of all players**.

(4 marks)

(ii) A random sample of **9** players is selected. Find the probability that their mean height is **between 170 cm to 185 cm**.

(5 marks)

(iii) A random sample of **16** players is selected. Find the probability that the mean height of basketball player is **more than the population mean by at least 5 cm**.

(4 marks)

Question 4 (25 Marks)

The time spent on revision, x (in hours) and exam mark, y (in %) of 8 students are given as below:

x	3	1	7	4	5	10	14	9
y	51	28	70	55	62	84	98	79

(a) Determine the least square regression equation for the data above. (15 marks)

(b) Predict the exam mark if the student spends 8.5 hours for revision. (2 marks)

(c) Plot the scatter diagram. (3 marks)

(d) Calculate the linear correlation coefficient, r and conclude the finding. (5 marks)

End of Paper